Mem. Natl Inst. Polar Res., Spec. Issue, **40**, 325–329, 1986

ADÉLIE PENGUIN CENSUS IN 1983–84 BREEDING SEASON IN THE SYOWA STATION AREA, EAST ANTARCTICA

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Abstract: The population number of the Adélie penguin in the rookeries of the Syowa Station area, East Antarctica was counted as part of the biological monitoring program of JARE-24. The maximum number at each rookery in the 1983–84 breeding season was in the range of the assumed population size, but the number of penguins increasing for two years since 1981 began to decline steeply in the 1983–84 season.

The annual fluctuation of penguin numbers in the Syowa Station area was discussed in relation to climatic and sea ice condition and possible human disturbances.

1. Introduction

The population census of the Adélie penguin (*Pygoscelis adeliae*) in the rookeries of the Syowa Station area has been carried out, in response to the program of International Survey of Antarctic Seabirds (ISAS) in the framework of the Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS).

In this short report, the results obtained by the wintering party of the 24th Japanese Antarctic Research Expedition (JARE-24) in the 1983–84 breeding season as part of the biological monitoring programs of the JARE are discussed. The penguin number was counted in six rookeries, namely, Ongulkalven, Mame-zima Island, Rumpa, Mizukuguri Cove, Hukuro Cove and Benten Island. All rookeries are located along the coast of Lützow-Holm Bay.

2. Results and Discussion

The annual fluctuation over ten years of the Adélie penguin population breeding in the rookeries of the Syowa Station area was compiled by HOSHIAI *et al.* (1984). According to HOSHIAI *et al.* (1984), the number of birds in most of rookeries decreased for the last ten years since 1970, but increased sharply in 1981, the maximum numbers attaining to 70 at Mame-zima Island in the 1981–82 season and 122 at Ongulkalven in 1982–83.

In the 1983–84 season, we counted the population number in two rookeries, Ongulkalven and Mame-zima Island where are the closest rookeries to Syowa Station, East Ongul Island. We found 3 individuals at Ongulkalven on 26 October, 1983 and 5 individuals at Mame-zima Island on 27 October, as the initial arrival in the 1983–84

Table 1. The population number of the Adélie penguin counted in the 1983–84 breeding season.

Date	Ongulkalven	Mame-zima Island	Hukuro Cove	Mizukuguri Cove	Rumpa	Benten Island
26 Oct. 1983	3	0	—	—	—	—
27 Oct.	4	5(2)	—	—	40	—
31 Oct.	6(2)	9(4)	—	—	—	—
7 Nov.	48(13)	44(14)	267	98	—	—
11 Nov.	58(17)	48(19)	—	—	—	—
12 Nov.	—	—	—	—	—	8
13 Nov.	—	—	—	—	1200	—
19 Nov.	59(25)	53(27)	—	—	—	—
22 Nov.	—	—	310(1)	101	840(2)	—
4 Dec.	—	—	199	53	486	—
8 Dec.	20	—	—	—	—	—
21 Dec.	15	9	—	—	—	—
22 Jan. 1984	—	21	—	—	—	—
Max. No.	59	53	310	101	1200	8

Parentheses indicate the number of marked penguins.

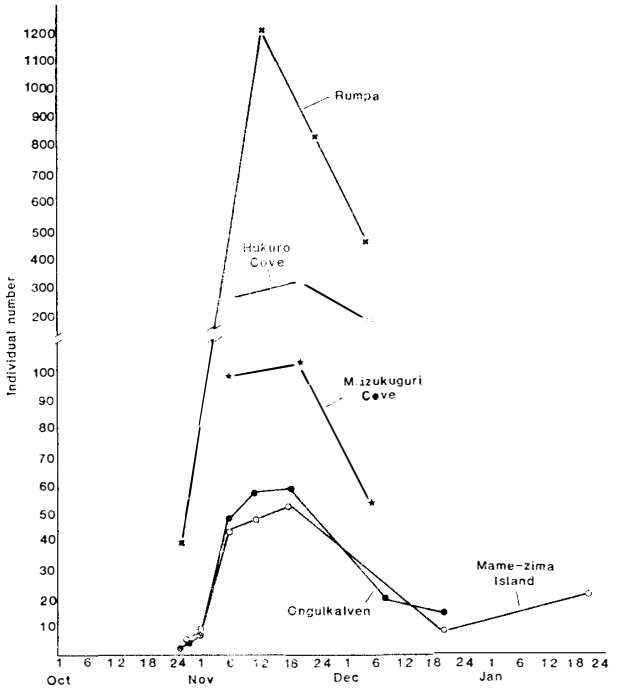

Fig. 1. Change in individual number of the Adélie penguin in the 1983–84 breeding season.

season (Table 1, Fig. 1). The maximum number on 19 November, 1983 was 59 at Ongulkalven and 53 at Mame-zima Island.

Table 2 shows that the maximum number counted at each rookery in 1983–84 was in the range of the population size assumed by HOSHIAI and MATSUDA (1979) and the number decreased to 48.4% of the 1982–83 counts at Ongulkalven and 88.3% at Mame-zima Island.

Table 2. Comparison of the maximum numbers of the Adélie penguin in 1982–83 and 1983–84 breeding seasons.

Breeding season	Ongulkalven	Mame-zima Island	Hukuro Cove	Mizukuguri Cove	Rumpa	Benten Island
1982–83	122	60	480	200	1500	12
1983–84	59	53	310	101	1200	8
1983–84/1982–83 (%)	48.4	88.3	64.5	50.5	80.0	66.6
Assumed population size*	50–150	30–70	250–400	80±30	1000–1500	5±5

* HOSHIAI and MATSUDA (1979).

Table 3. The number of marked penguins which returned to their rookeries.

Date	Ongulkalven	Mame-zima Island
17–20 Jan. 1972	55	—
1 Feb. 1972	—	8
15 Nov. 1972	39	—
1971–72/1972–73 (%)	70.9	—
22 Nov. 1982	98	54
19 Nov. 1983	23	27
1982–83/1983–84 (%)	23.4	50.0

The marking by the flipper bands was undertaken by JARE-23 in late November 1982 (Table 3). The birds from Ongulkalven marked in the 1982–83 season returned to their rookery with the low rate of 23.4% and those of Mame-zima Island with 50%. One bird marked at Ongulkalven in the 1982–83 season was found in Hukuro Cove and three birds were in Rumpa, while two marked at Mame-zime Island were recovered in Rumpa and one band was picked up there. The recovery rate was remarkably low in comparison with the penguins marked by AOYANAGI (1973) in the 1971–72 season which showed a high recovery rate of 70.9% in the next year.

Figure 2 shows the annual fluctuation of Adélie populations during the last twenty years emending the schema of HOSHIAI *et al.* (1981, 1984). The number of penguins increasing for two years since 1981 began to decline steeply in the 1983–84 season. The annual fluctuation is considered to be cyclical with the interval between peak numbers of approximately 12 years. HOSHIAI *et al.* (1984) supposed that such a fluctuation was dependent on the sea ice condition, the number of penguins increasing in years when weaker ice conditions permitted the icebreaker to approach to the shore of the Ongul Islands, following the opinion of STONEHOUSE (1967). They also mentioned the viewpoint of KUSUNOKI (1979) who suggested that there existed about a 10-year cycle in the climatic and ice condition in the Lützow-Holm Bay area. The fluctuation of penguin numbers in the vicinity of Syowa Station is probably related to the sea ice condition, but the fluctuation with a period of 12 years is apparently not coincident with the periodicity of the climatic conditions.

THOMSON (1977) discussed effects of the human disturbance on a penguin rookery in the Cape Royds, Ross Island. In the case of the Syowa Station area, if human disturbance is related to the decrease in number of penguins in 1983–84, it was probably

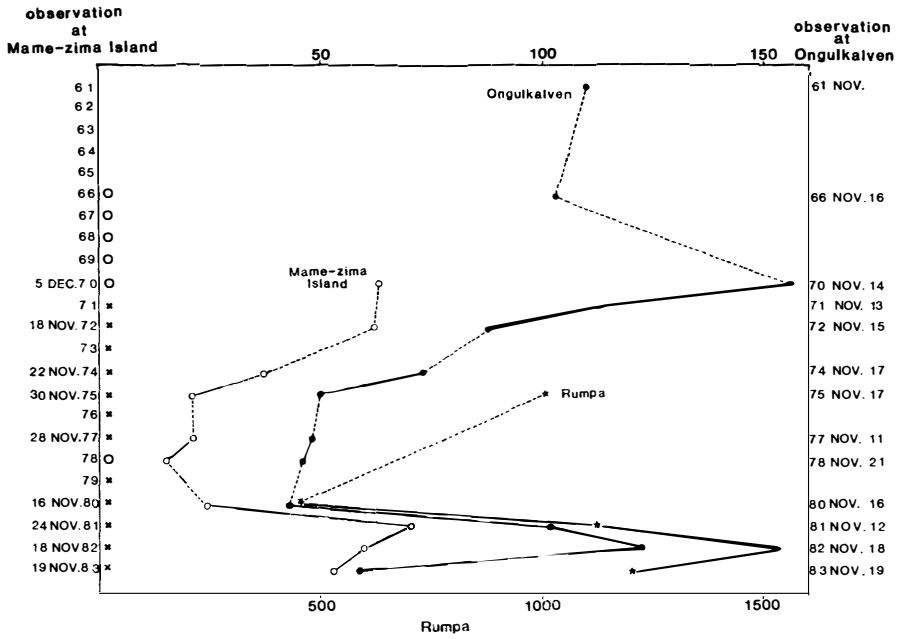

Fig. 2. Annual fluctuation of individual numbers of the Adélie penguin in the rookeries of Ongulkalven, Mame-zima Island and Rumpa. The success and failure in the arrival of FUJI (SHIRASE in 1983) at Syowa Station are denoted as ○ and × in the corresponding seasons (modified from HOSHIAI et al., 1981, 1984).

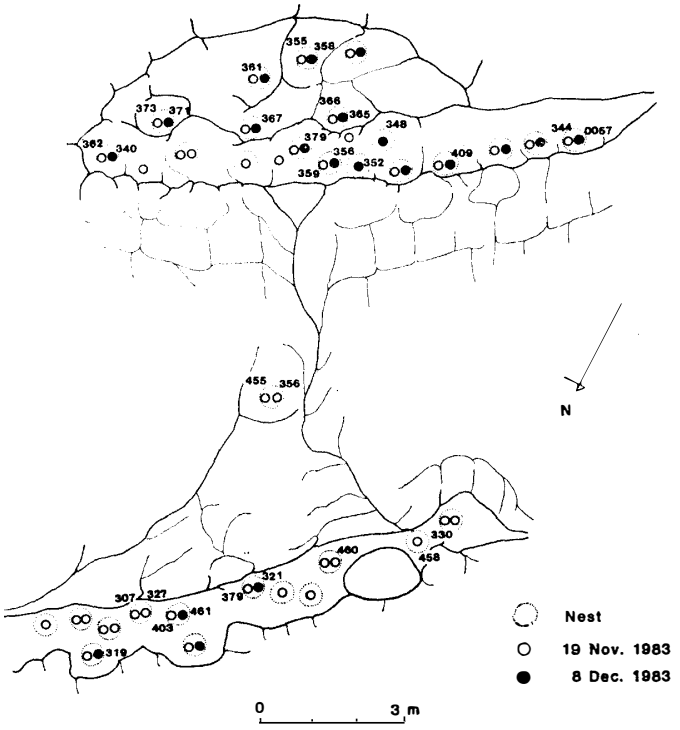

Fig. 3. Location of the penguin population in the Ongulkalven rookery showing the number of the marked penguins in the observation on 19 November and 8 December, 1983.

done during the flipper banding by the 1982–83 party. However, it is necessary to examine the human disturbance by long-term monitoring of the penguin numbers.

Figure 3 shows the location of the penguin population in the Ongulkalven rookery. It explains the change of numbers of the marked penguins in the observations of 19 November and 8 December, 1983, when 13 occupied nests (22 birds) were found at the seaside on 19 November and only 4 occupied nests (4 birds) remained on 8 December. Similarly, the 19 occupied nests (35 birds) at the upper side reduced to 16 occupied nests (16 birds).

The lower seaside rookery is more open and exposed than the upper rookery and consequently the predation rate by skuas may be higher in the lower colony.

One bird (band number 0057), which had been marked in the 1971–72 season, was found at the upper right side of the higher rookery in 1983–84. It is noteworthy that this bird has come to the same island over 13 years. Thus, the counts of the individuals and description of the location of the population at the rookery are useful to investigate the behavior of the penguin population. Especially the 98 marked penguins in Ongulkalven and 54 in Mame-zima Island will provide the basis for long-term monitoring the number and distribution of birds at these localities.

Acknowledgments

The authors gratefully thank the personnel of JARE-24 who offered their data in the present study. They also extend their thanks to Dr. R. D. SEPPELT, Antarctic Division, Australia, who kindly read the manuscript and offered valuable criticism.

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(Received July 1, 1985; Revised manuscript received July 31, 1985)